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Prevalence of premenstrual syndrome among medical students in King Faisal University in Alahssa-Saudi Arabia

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ABSTRACT

Background: Premenstrual syndrome (PMS) is a collection of excruciating psychological and behavioral symptoms with or without physical (somatic) symptoms that are not caused by organic disease. PMS is associated with women's menstrual cycle specifically throughout the luteal phase. **Aim:** This study aimed to measure the prevalence of PMS among medical students, its effect on the quality of life, and the contributing factors. **Methods:** A cross-sectional study was conducted among female medical students at King Faisal University, AlAhssa, Saudi Arabia. A self-administered questionnaire consisted of socio-demographic, gynecologic, and obstetric history including the presence of chronic diseases, body mass index, contraception use, and duration of usage; moreover, evaluation of the severity of PMS symptoms, their impact on the quality of life, and lifestyle behaviors. All statistical analyses were performed using SPSS version 21. **Results:** A total of 258 medical students were recruited with 20–23 years old was the dominant age group. The prevalence of premenstrual syndrome was 23.3%. Of them, 11.2% were moderate and 12.5% were severe to extremely severe which is defined as Premenstrual Dysphoric Disorder (PMDD). In a multivariate regression model, pain killers and high salt intake were the independent significant predictors of the increased risk of PMS, while older age at menarche, being single and overweight/obese were the independent significant predictors of the decreased risk of PMS. **Conclusion:** The presence of PMS among medical students on our campus was not widely prevalent. Abdominal cramps, back pain, weight gain, depressed mood, and anger were the most reported symptoms of PMS.

Keywords: Premenstrual syndrome, medical students, PMDD, woman, PMS.



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1. INTRODUCTION

The regular monthly menstrual cycle triggers normative alterations in women's physiological functioning (Schmalenberger et al., 2021). Females of reproductive years represent about 49.7% of the worldwide female population, along with 24.6% of the total population; about 58% of these ladies are surely cycling (Dubol et al., 2020). Moreover, on these days and ages, women's welfare considered as a critical concern in different aspects for instance; social, investment advancement from claiming social orders; consequently, diseases that weaken women's physical and psychological health such as premenstrual syndrome PMS is also an essential topic (El Kholy et al., 2021; Olson et al., 2015). Premenstrual syndrome PMS well-known as a collection of excruciating psychological and behavioral symptoms with or without physical (somatic) symptoms that are not caused by organic disease (Chumpalova et al., 2020; Tabassum et al., 2005; ADM et al., 2014).

PMS is associated with women's menstrual cycle. It occurs throughout the menstruation's luteal phase (ADM et al., 2014). The luteal phase starts after ovulation and ends with the start of menstruation. This means that the symptoms of PMS also disappear when the menstruation started to flow (Hofmeister & Bodden, 2016; O'Brien et al., 2011). The frequency of PMS in premenopausal age is 20-32% (Biggs & Demuth, 2011; Yonkers et al., 2008) and 30-40% of reproductive age (Baker & O'Brien, 2012). Besides about 85% of reproductive-aged women have been reported experiencing one or more premenstrual symptoms, and 2-10% report inactivating, debilitating symptoms (Dickerson et al., 2003). Over 200 symptoms have been associated with PMS (Steiner & Born, 2000; Dickerson et al., 2003). Otherwise, more than 100 physical and psychological symptoms have been reported to occur (Abu Alwafa et al., 2021; Steiner, 2000). Common PMS symptoms include mood swings, depression, irritability, abdominal cramps, headache, generalized pain, abdominal bloating, swollen \ tender breast, and appetite changes (Abu Alwafa et al., 2021).

However, the most known and regularly described symptoms are irritability, tension, and dysphoria (Steiner & Born, 2000). The symptoms are cyclic and frequent in addition the symptoms can alter in level and intensity in different cycles (Silva et al., 2006). PMS alters women's quality of life, financial and social accomplishment (ADM et al., 2014; Arbabi et al., 2008). Furthermore, around 23- 31% of reproductive-aged women have PMS up to the level that disturbs their daily lives (Hylan et al., 1999), as lowering the work productivity, and work \ school non-attendance (Frankel et al., 2021; Borenstein et al., 2003; Tschudin et al., 2010). On the other hand, Premenstrual dysphoric disorder (PMDD), labeled as the most serious form of PMS (Thakrar et al., 2021), and has been reported around 3-9% in women (Cohen et al., 2002). PMDD has a psychiatric symptom of alter lability, irritability, depressed mood, and anxiety (Dubol et al., 2020), anger, with violence being the behavioral consequence of these symptoms (Kaltsouni et al., 2021). Due to impairment of the brain either anatomical or functional. Moreover, the cyclicity of symptoms indicates mal adaptive of the brain to respond to the fluctuations of the ovarian hormones (Dubol et al., 2020; Comasco & Sundström, 2015).

Consequently, anticipated the significance value of this topic in women's health and mental health. Moreover, since research has been done on PMS and PMDD in many countries and different age groups we decided to measure it among medical students and measure the effects of PMS and PMDD among this group.

2. MATERIALS AND METHODS

Study design, date, setting, and ethical concerns

This was a cross-sectional study conducted during January 2021 among medical students at King Faisal University, Alahssa, Kingdom of Saudi Arabia. This study was approved by the research ethics committee of King Faisal University. Furthermore, informed consent was obtained from participants before administering the questionnaire, and the purpose of the study was clearly explained.

Sample size

Online sample size calculator, RaoSoft® was used; minimum effective sample 258 was calculated out of the total 750 female students at the college of medicine. Eligible participants were Saudi, medical students studying at King Faisal University, and those aged above 18 years old. Participants who did not complete the entire survey were excluded.

Questionnaire method

The survey was designed using google forms and then was distributed online through the WhatsApp groups. It is a self-administered questionnaire that consisted of four parts. The questionnaire includes socio-demographic characteristics, their gynecologic/obstetric history; PMS symptoms that were assumed to develop that were modeled from different literature with its effects, and their lifestyle. In this study, the criteria proposed by Diagnostic and Statistical Manual of Mental Disorders, fourth edition, text revision (DSM-IV) was used to assess the prevalence of PMS (as PMS not classified as a mental illness in the Diagnostic

and Statistical Manual of Mental Disorders, 5th Edition (DSM-5)). The questionnaire was taken from the study of Tolossa and Bekele (Tolossa & Bekele, 2014) as well as Bhuvaneswari (Bhuvaneswari et al., 2019).

Statistical Analysis

Descriptive statistics were presented using numbers and percentages. The relationship between the PMS and the socio-demographic and the other lifestyle behaviors of the medical students had been conducted using the Chi-square test. Significant values presented in the Chi-square test had been placed in the multivariate regression model to determine the independent significant factor associated with PMS where the adjusted odds ratios, as well as 95% confidence interval, were also being reported. A p-value of <0.05 was considered statistically significant. The data analyses were performed using Statistical Packages for Software Sciences (SPSS) version 21, Armonk, New York, IBM Corporation.

3. RESULTS

This study enrolled 258 medical students to evaluate the prevalence of PMS. Table 1 presented the socio-demographic characteristics of medical students. The majority age group was 20 – 23 years old with most of them were not married (81.8%). With respect to their educational level, 22.9% were at the first-year level, followed by a fifth-year level (20.5%). Furthermore, nearly all the students (87.2%) were living with their families. The proportion of medical students who had chronic diseases was 5%, with asthma (30.8%) and sickle cell disease (30.8%) was the most mentioned chronic diseases. In addition, nearly 60% were having normal BMI, 23.3% were underweight and 12.8% were overweight.

Table 1 Socio demographic characteristics of medical students (n=258)

Study variables	N (%)
Age group	
<20 years	62 (24.0%)
20–23 years	170 (65.9%)
>23 years	26 (10.1%)
Marital status	
Unmarried	211 (81.8%)
Married	47 (18.2%)
Academic year level	
First year	59 (22.9%)
Second year	51 (19.8%)
Third year	51 (19.8%)
Fourth year	44 (17.1%)
Fifth year	53 (20.5%)
Residence	
In the dorm	24 (09.3%)
In private room	09 (03.5%)
With family	225 (87.2%)
Chronic diseases	
Yes	13 (05.0%)
No	245 (95.0%)
Specific chronic diseases	
Asthma	04 (30.8%)
Sickle cell disease	04 (30.8%)
PCOS	02 (15.4%)
Other	03 (23.1%)
BMI level	
Underweight	60 (23.3%)
Normal	151 (58.5%)
Overweight	33 (12.8%)
Obese	14 (05.4%)

Table 2 described the obstetrics and gynecologic characteristics of medical students. Following the results, more than a half (51.2%) started menstruation at the age of 13 – 15 years old, with a similar proportion (51.9%) on 6– 8 days bleeding cycle. We also observed an average length of one cycle of more than 28 days while nearly three-quarters (74.8%) reported moderate menstrual flow type. Dysmenorrhea during the menstrual period sometimes felt by 36% while 26.4% frequently experienced it. The proportion of medical students who were using contraception was 11.6%. Of those who used contraception, the contraceptive patch was the most used type of contraception method (8.9%), whereas a similar proportion had been identified regarding the duration of usage (≤ 1 year: 5.8% versus >1 year: 5.8%).

Table 2 Obstetrics and gynecologic characteristics of medical students (n=258)

Variables	N (%)
Age at menarche	
<13 years old	119 (46.1%)
13 – 15 years old	132 (51.2%)
> 15-year-old	07 (02.7%)
Number of days bleeding per one cycle	
1 – 3 days	04 (01.6%)
4 – 5 days	98 (38.0%)
6 – 8 days	134 (51.9%)
>8 days	22 (08.5%)
Average length of one cycle	
<28 days	69 (26.7%)
28 days	65 (25.2%)
>28 days	124 (48.1%)
Menstrual flow type	
Mild	08 (03.1%)
Moderate	193 (74.8%)
Heavy	53 (20.5%)
Extremely heavy	04 (01.6%)
Dysmenorrhea	
Never	14 (05.4%)
Rarely	34 (13.2%)
Sometimes	93 (36.0%)
Frequently	68 (26.4%)
Always	49 (19.0%)
Family history of PMS/PMDD	
Yes	109 (42.2%)
No	149 (57.8%)
Use of contraception	
Yes	30 (11.6%)
No	228 (88.4%)
Type of contraception	
I never use it	228 (88.4%)
Oral contraception	07 (02.7%)
Contraceptive patch	23 (08.9%)
Duration of contraception used	
I never use it	228 (88.4%)
≤ 1 year	15 (05.8%)
>1 year	15 (05.8%)

In Table 3, it showed the impact of PMS on the performance impairment of medical students. It was revealed that around one-third of them (32.9%) was leaving early during the class, because of PMS, 29.1% indicated low-grade scoring and 22.5% reported lower grades than boys. The prevalence of students who seek treatment due to PMS was 11.2% and the most common type of treatment was hot drinks like coffee (71.3%) and painkillers (57.4%).

Table 3 The impact of PMS in performance impairment (n=258)

Variables	N (%)
Performance academic impairment *	
Frequent class missing	42 (16.3%)
Exam missing	08 (03.1%)
Leaving early during the class	85 (32.9%)
Grades are lower than boys	58 (22.5%)
Low grade scoring	75 (29.1%)
Treatment of PMS	
Yes	29 (11.2%)
No	229 (88.8%)
Type of PMS treatment *	
Painkillers	148 (57.4%)
Hot drinks like coffee or tea	184 (71.3%)
Massage	63 (24.4%)
Exercise	53 (20.5%)
Others	62 (24.0%)

* Variables with multiple responses.

For the lifestyle behavior of medical students (Table 4), we noticed that only 1.6% (n=4) were currently a smoker. The proportion of medical students who were engaged in physical activity was 44.2%. Furthermore, nearly three-quarters (72.5%) had regular sleeping hours of 6 – 10 hours. Similarly, 45.3% were taking one cup per day of caffeine consumption. When asked about the amount of salt intake, 79.1% indicated that they are taking normal amounts, others were taking moderately high (18.6%). Likewise, for the consumption of sweets, those who were eating sometimes or often eating sweets food constitute 51.2% and 40.3%, respectively. Additionally, for the consumption of junk food, those who were eating sometimes and often constitutes 67.1% and 26%, respectively.

Table 4 Lifestyle behavior of women (n=258)

Variables	N (%)
Smoking	
Yes	04 (01.6%)
No	254 (98.4%)
Frequency of smoking (n=4)	
Frequently	01 (05.0%)
Sometimes	03 (75.0%)
Physical activity	
Yes	114 (44.2%)
No	144 (55.8%)
Duration of sleep	
<6 hours	55 (21.3%)
6 – 10 hours	187 (72.5%)
>10 hours	16 (06.2%)
Caffeine consumption	
Never	88 (34.1%)

One cup a day	117 (45.3%)
More than one cup	53 (20.5%)
Amount of salt intake	
Normal	204 (79.1%)
Moderately high	48 (18.6%)
High	06 (02.3%)
Consumption of sweets	
Usually	22 (08.5%)
Often	104 (40.3%)
Sometimes	132 (51.2%)
Consumption of junk food	
Usually	18 (07.0%)
Often	67 (26.0%)
Sometimes	173 (67.1%)

In Table 5, abdominal cramps were the most reported somatic symptoms (severe: 40.3%), followed by either back pain (severe: 39.1%) or weight gain (severe: 39.1%) while weight loss was the least mentioned (severe: 0.80%). Figure 1 depicted the prevalence of psychological symptoms, it was revealed that the most known symptoms were depressed mood (89.9%), followed by anger (86.4%) and loss of interest (65.1%) whereas forgetfulness was the least mentioned (36%).

Table 5 Prevalence of somatic symptoms (n=258)

Variables	Mild N (%)	Moderate N (%)	Severe N (%)
Abdominal bloating	104 (40.3%)	104 (40.3%)	50 (19.4%)
Breast tenderness	143 (55.4%)	84 (32.6%)	31 (12.0%)
Abdominal cramps	58 (22.5%)	96 (37.2%)	104 (40.3%)
Generalized body pain	98 (38.0%)	115 (44.6%)	45 (17.4%)
Back pain	68 (26.4%)	89 (34.5%)	101 (39.1%)
Weight gain	161 (62.4%)	68 (26.4%)	101 (39.1%)
Weight loss	248 (96.1%)	08 (03.1%)	02 (0.80%)
Vomiting	199 (77.1%)	49 (19.0%)	10 (03.9%)
Shortness of breath	203 (78.7%)	39 (15.1%)	16 (06.2%)
Headache	123 (47.7%)	83 (32.2%)	52 (20.2%)

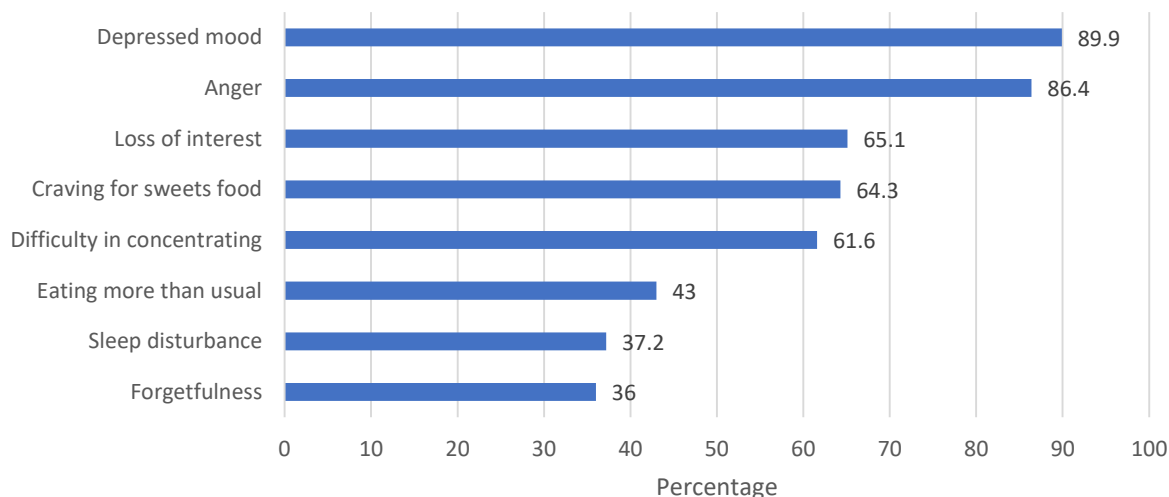


Figure 1 Prevalence of psychological symptoms

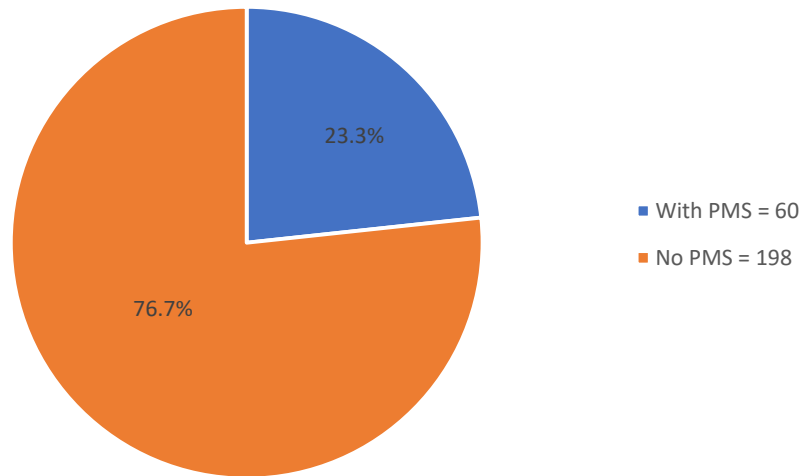


Figure 2 Prevalence of PMS among medical students at King Faisal University

Figure 2 showed the prevalence of PMS detected among medical students. It was found the prevalence of PMS was found among 23.3%, while 76.7% did not have PMS. With regards to PMS severity, minimal, mild, moderate PMS were detected among 20.9%, 18.6%, 11.2%, respectively, while severe and extremely severe were found 7.8% and 4.7%, respectively which are defined as PMDD (Figure 3).

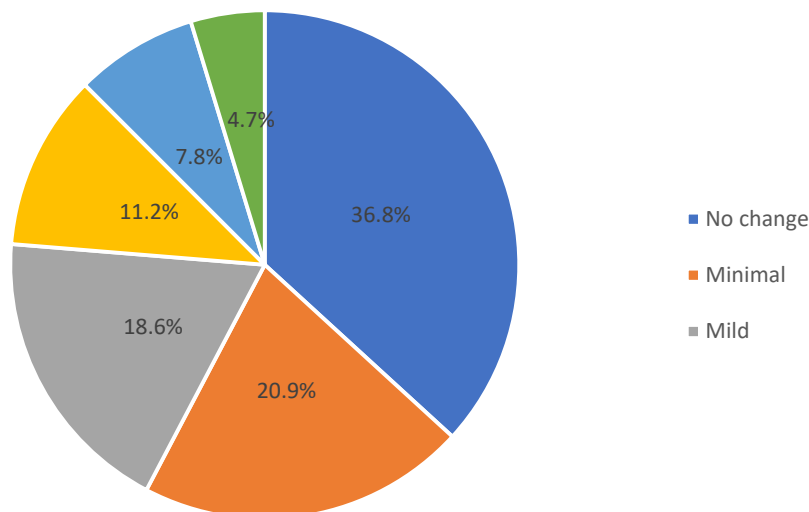


Figure 3 Severity of PMS among medical students at King Faisal University

When measuring the relationship between PMS regarding the socio-demographic, obstetrics, and gynecologic characteristics of medical students, it was revealed that marital status ($X^2=5.370$; $p=0.020$), BMI level ($X^2=7.001$; $p=0.008$), and age at menarche ($X^2=6.058$; $p=0.014$) showed a significant relationship with PMS or without PMS (Table 6). When measuring the influence of PMS on the performance and lifestyle behavior of medical students, we have known that painkillers for PMS treatment ($X^2=11.910$; $p=0.001$) and amount of salt intake ($X^2=7.409$; $p=0.025$) were observed to have a positive relationship with PMS or without PMS (table 7).

Table 6 Influence of PMS in the socio demographic, obstetric and gynecologic characteristics of medical students (n=258)

Factor	With PMS N (%) (n=60)	Without PMS N (%) (n=198)	X2	P-value [§]
Age group				
<20 years	11 (18.3%)	51 (25.8%)	1.452	0.484
20 – 23 years	43 (71.7%)	127 (64.1%)		
>23 years	06 (10.0%)	20 (10.1%)		
Marital status				
Unmarried	43 (71.7%)	168 (84.8%)	5.370	0.020 **
Married	17 (28.3%)	30 (15.2%)		
Academic year level				
Junior students	35 (58.3%)	126 (63.6%)	0.552	0.458
Senior students	25 (41.7%)	72 (36.4%)		
Living				
Dorm/private room	09 (15.0%)	24 (12.1%)	0.342	0.559
With family	51 (85.0%)	174 (87.9%)		
Chronic diseases				
Yes	03 (05.0%)	10 (05.1%)	0.000	0.987
No	57 (95.0%)	188 (94.9%)		
BMI level				
Normal/Underweight	56 (93.3%)	155 (78.3%)	7.001	0.008 **
Overweight/Obese	04 (06.7%)	43 (21.7%)		
Age at menarche				
<13 years old	36 (60.0%)	83 (41.9%)	6.058	0.014 **
≥13 years old	24 (40.0%)	115 (58.1%)		
Number of days bleeding per one cycle				
≤5 days	22 (36.7%)	80 (40.4%)	0.269	0.604
>5 days	38 (63.3%)	118 (59.6%)		
Average length of one cycle				
<28 days	14 (23.3%)	55 (27.8%)	0.469	0.791
28 days	16 (26.7%)	49 (24.7%)		
>28 days	30 (50.0%)	94 (47.5%)		
Menstrual flow type				
Mild – Moderate	51 (85.0%)	150 (75.8%)	2.285	0.131
Heavy – Extremely Heavy	09 (15.0%)	48 (24.2%)		
Dysmenorrhea				
Never/rarely	12 (20.0%)	36 (18.2%)	0.429	0.807
Sometimes	23 (38.3%)	70 (35.4%)		
Frequently/Always	25 (41.7%)	92 (46.5%)		
Family history of PMS/PMDD				
Yes	23 (38.3%)	86 (43.4%)	0.491	0.483
No	37 (61.7%)	112 (56.6%)		
Use of contraception				
Yes	07 (11.7%)	23 (11.6%)	0.000	0.991
No	53 (88.3%)	175 (88.4%)		

§ P-value has been calculated using Chi-square test.

** Significant at p<0.05 level.

Table 7 Influence of PMS in the performance and lifestyle behavior of medical students (n=258)

Factor	With PMS N (%) (n=60)	Without PMS N (%) (n=198)	X2	P-value §
Performance academic impairment *				
Frequent class missing	07 (11.7%)	35 (17.7%)	1.220	0.269
Exam missing	01 (01.7%)	07 (03.5%)	0.535	0.464
Leaving early during the class	14 (23.3%)	71 (35.9%)	3.270	0.071
Grades are lower than boys	12 (20.0%)	46 (23.2%)	0.276	0.599
Low grade scoring	20 (33.3%)	55 (27.8%)	0.689	0.406
Treatment of PMS				
Yes	06 (10.0%)	23 (11.6%)	0.121	0.728
No	54 (90.0%)	175 (88.4%)		
Type of PMS treatment *				
Pain killers	46 (76.7%)	102 (51.5%)	11.910	0.001 **
Hot drinks like coffee or tea	45 (75.0%)	139 (70.2%)	0.518	0.472
Massage	14 (23.3%)	49 (24.7%)	0.050	0.823
Exercise	12 (20.0%)	41 (20.7%)	0.014	0.905
Others	11 (18.3%)	51 (25.8%)	1.390	0.238
Smoking				
Yes	02 (03.3%)	02 (01.0%)	1.628	0.202
No	58 (96.7%)	196 (99.0%)		
Physical activity				
Yes	29 (48.3%)	85 (42.9%)	0.545	0.460
No	31 (51.7%)	113 (57.1%)		
Duration of sleep				
<6 hours	14 (23.3%)	41 (20.7%)	0.338	0.844
6 – 10 hours	43 (71.7%)	144 (72.7%)		
>10 hours	03 (05.0%)	13 (06.6%)		
Caffeine consumption				
Never	21 (35.0%)	67 (33.8%)	0.548	0.760
One cup a day	25 (41.7%)	92 (46.5%)		
More than one cup	14 (23.3%)	39 (19.7%)		
Amount of salt intake				
Normal	52 (86.7%)	152 (76.8%)	7.409	0.025 **
Moderately high	05 (08.3%)	43 (21.7%)		
High	03 (05.0%)	03 (01.5%)		
Consumption of sweets				
Usually	03 (05.0%)	19 (09.6%)	1.679	0.432
Often	23 (38.3%)	81 (40.9%)		
Sometimes	34 (56.7%)	98 (49.5%)		
Consumption of junk food				
Usually	05 (08.3%)	13 (06.6%)	0.536	0.765
Often	17 (28.3%)	50 (25.3%)		
Sometimes	38 (63.3%)	135 (68.2%)		

§ P-value has been calculated using Chi-square test.

** Significant at p<0.05 level.

Table 8 Multivariate regression analysis to determine the independent significant factor associated with PMS (n=258)

Factor	AOR	95% CI	P-value
Marital status			
Unmarried	0.376	0.175 – 0.811	0.013 **
Married	Ref		
BMI level			
Normal/Underweight	Ref		
Overweight/Obese	0.239	0.078 – 0.730	0.012 **
Age at menarche			
<13 years old	Ref		
≥13 years old	0.506	0.267 – 0.960	0.037 **
Treatment – Pain killers			
Yes	3.218	1.598 – 6.480	0.001 **
No	Ref		
Amount of salt intake			
Normal	Ref		
Moderately high	2.938	0.484 – 17.841	0.242
High	10.703	1.415 – 80.927	0.022 **

AOR – Adjusted Odds ratio; CI – Confidence Interval

** Significant at p<0.05 level.

A multivariate regression analysis was subsequently performed in (Table 8) to determine the independent significant predictor of PMS. Based on the results, it was discovered that the odds of having PMS for those single students were likely to decrease by 60% than those married students (AOR=0.376; 95% CI=0.175 – 0.811; p=0.013). We also observed that compared to those with a normal/underweight student, the odds of having PMS for those with overweight/obese will similarly decrease by 50% (AOR=0.503; 95% CI=0.267 – 0.960; p=0.037). Furthermore, those who were taking painkillers for the treatment of PMS could likely increase the chance of having PMS by 3.218 times higher compared to those who were not taking it (AOR=3.218; 95% CI=1.598 – 6.480; p=0.001) while the chance of having PMS for those who were taking high salt intake could also likely increase in as much as 10.703 times higher (AOR=10.703; 95% CI=1.415 – 80.927; p=0.022).

4. DISCUSSION

The present study evaluated 258 medical students to assess the prevalence of premenstrual syndrome (PMS). Depending on the use of diagnostic instruments, the prevalence of PMS estimates from 18 – 40% (Tolossa & Bekele, 2014; Bakhsh et al., 2020; Raval et al., 2016; Buddhabunyakan et al., 2017; Cheng et al., 2013; Chumpalova et al., 2020; Kamat et al., 2019). Our results demonstrated that the prevalence of PMS was within the previously mentioned range, with a prevalence rate of 23.3%. Other literature reported higher prevalence rate such as the study conducted in India (Bhuvaneswari et al., 2019) in Turkey (Acikgoz et al., 2017), in Brazil (Victor et al., 2019), and in Northwest Ethiopia (Abeje & Berhanu, 2019). Furthermore, the prevalence of PMDD in this study was 12.5% which was similar to the study conducted in Riyadh, Saudi Arabia, with PMDD prevalence of 10% (Bakhsh et al., 2020), but higher than the study reported in Bulgaria, with 3.3% (Chumpalova et al., 2020).

Our investigation also revealed that a high intake of salt was estimated to increase the chance of PMS which was consistent with the study of Bhuvaneswari et al., (2019) where they accounted that the high amount of salt significantly influenced the PMS. They further indicated that the type of sweets and consumption of junk food, presence of dysmenorrhea, a family history of PMS, and consumption of caffeine were all significantly associated with PMS. However, in our study, all these variables did not show a significant relationship with PMS. Another variable that showed influence with PMS was taking pain killers where it was estimated that taking pain killers increased the chance of PMS. On the other hand, we also noted independent significant factors such as being unmarried, being overweight/obese, and the older age group (≥13 years old) at menarche. These variables were inversely associated with PMS, where the likelihood risk of having PMS could likely to decrease which varied from 50% to 70%. Apparently, in a study done by Bakhsh et al., (2020), they found a significant difference between the age group and PMS. This had also been reported by Abeje and Berhanu (2019), where they documented that the occurrence of PMS was significantly influenced by age. However, this

has not been the case in our study, as the age group did not reveal a significant relationship with the presence of PMS which was consistent with the study done in India (Raval et al., 2016) and in Turkey (Acikgoz et al., 2017).

In relation to somatic symptoms, medical students experience severe symptoms mostly with abdominal cramps (40.3%), followed by back pain (39.1%) and weight gain (39.1%). In several literature, abdominal bloating or abdominal cramps were the most consistently mentioned somatic symptoms of PMS (Tolossa & Bekele, 2014; Bhuvaneshwari et al., 2019; Chumpalova et al., 2020; Abeje & Berhanu, 2019; Balaha et al., 2010). Other papers reported generalized body pain (Bakhsh et al., 2020) or breast tenderness (Buddhabunyakan et al., 2017). For the psychological symptoms, depressed mood, anger, and loss of interest were the most reported psychological behavior associated with PMS. These findings are comparable to the study published in Ethiopia (Tolossa & Bekele, 2014). They reported that loss of interest, followed by depressed mood, and anger feeling were the most frequently affected psychological symptoms among female students. In Riyadh, Saudi Arabia (Bakhsh et al., 2020), among 274 female university students, it was found that tearful and increased sensitivity to rejection were the most severe symptoms, followed by hypersomnia. Other literature reported, fatigue and irritability (Raval et al., 2016; Chumpalova et al., 2020; Mohib et al., 2018; Shah & Cheistian, 2020; Adigüzel et al., 2007; Daşkan, 2021) or anxiety (Buddhabunyakan et al., 2017), as the most frequently mentioned psychological symptoms experienced by the university students.

Moreover, most of the medical students (88.8%) did not seek medical treatment in relation to PMS; only 11.2% indicated otherwise. The most reported PMS treatment method was hot drinks like coffee or tea (71.3%) and painkillers (57.4%). These findings are consistent with the paper of Tolosa and Bekele (2014), based on their accounts, female students with PMS used painkillers and hot drinks including coffee and tea as PMS treatment modalities. However, in a study by Bakhsh et al., (2020), university students preferred taking medication to relieve PMS (47.1%) without proper medical advice which was in line with our results. In Thailand (Buddhabunyakan et al., 2017), reports indicated that 70.6% of the students consulted physicians to treat PMS with 76.9% of the students got absent from the school due to PMS which did not coincide with our reports.

It can be further noted that there were 32.9% of medical students who left early during the class because of pain caused by the PMS, 29.1% had low-grade scoring, 22.5% resulted in lower grades than boys and 16.3% had frequently missed class. In Ethiopia (Tolossa & Bekele, 2014), the most frequently mentioned performance academic impairment was frequent class missing (28.3%) and exams missing (9.8%) which were also mentioned in our reports. In the lifestyle behavior of medical students, 44.2% were physically active on a regular basis, and 72.5% were able to get enough sleep. For the frequency of caffeine consumption, nearly half (45.3%) consumed one cup of coffee per day however medical students demonstrated that there was no significant intake in the amount of taking salt with only 18.6% observed to have moderately high salt intakes. The consumption of sweets and junk food were also less with only 8.5% and 7% respectively were taking them regularly. These results are not comparable to the paper by Acikgoz and associates (Acikgoz et al., 2017).

According to their reports which were obtained from the first-year university students, 62.3% stated that they did not eat an adequate and balanced diet, and they were more in consuming salt or salty foods (58.4%). The intake of coffee per day was more (59.9%) with similar findings in consuming chocolate (59.2%) and 63% had a high-fat and a high-calorie intake.

5. CONCLUSION

The presence of PMS among medical students on our campus was not widely prevalent while severe PMS was defined by a minority. Abdominal cramps, back pain, weight gain, depressed mood, and anger were the most reported symptoms of PMS. Furthermore, the risk of having PMS could possibly increase among women who were taking painkillers and those who had high salt intakes while it could be less among unmarried, overweight/obese, and those with late menarche. Further research is needed to define the exact prevalence of PMS in our region and to identify the factors associated with it.

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Author contributions

Dr. Fatimah was involved in Supervision and analysis of the manuscript. Layla was involved in the concept and design of the study, active in the process of data collection and writing the manuscript that contributed substantially to the work in a timely and meticulous manner. Zahraa & Zainab were active in the process of data collection and writing the manuscript that contributed substantially to the work in a timely and meticulous manner. All authors wrote, reviewed and approved the final manuscript.

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Ethical approval

The study was approved by the Medical Ethics Committee of King Faisal University (ethical approval code: 2020- 12 - 05).

Conflict of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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